



# **STIC Search Report**

**EIC 1700**

**STIC Database Tracking Number: 159492**

**TO: John Chu**  
**Location: REM 9D51**  
**Art Unit : 1752**  
**July 29, 2005**

**Case Serial Number: 10/690779**

**From: Usha Shrestha**  
**Location: EIC 1700**  
**REMSEN 4B28**  
**Phone: 571/272-3519**  
**usha.shrestha@uspto.gov**

## **Search Notes**



# STIC Search Results Feedback Form

**EIC17000**

Questions about the scope or the results of the search? Contact *the EIC searcher* or contact:

Kathleen Fuller, EIC 1700 Team Leader  
571/272-2505 REMSEN 4B28

## Voluntary Results Feedback Form

- I am an examiner in Workgroup:  Example: 1713  
➤ Relevant prior art **found**, search results used as follows:

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest.
- ☐ Helped examiner better understand the invention.
- ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature  
(journal articles, conference proceedings, new product announcements etc.)

➤ Relevant prior art **not found**:

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to EIC1700 REMSEN 4B28

**Mellerson, Kendra**

---

**From:** Unknown@Unknown.com  
**Sent:** Thursday, July 14, 2005 4:41 PM  
**To:** STIC-EIC1700  
**Subject:** Generic form response

ResponseHeader=Commercial Database Search Request

AccessDB#= 159492

LogNumber= \_\_\_\_\_

Searcher= \_\_\_\_\_

SearcherPhone= \_\_\_\_\_

SearcherBranch= \_\_\_\_\_

MyDate=Thu Jul 14 16:40:14 EDT 2005

submitto=STIC-EIC1700@uspto.gov

Name=John Chu

Empno=68314

Phone=272-1329

Artunit=1752

Office=Rem 9d-51

Serialnum=10/690,779

PatClass=403/157

Earliest=10/23/2002

Format1=paper

Searchtopic=Please search the claimed recording material. Look for the coupler compound of Formula (I), which is where the invention is located. The diazo compound is known to be used with other couplers (hydroxyl containing compounds).

Thank you!  
John

Comments=

send=SEND

SCIENTIFIC REFERENCE BR  
Sci & Tech Inf. Ctr

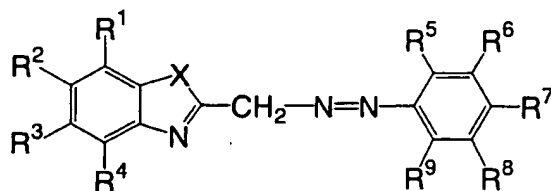
JUL 15 RECD

Pat. & T.M. Office

# ABSTRACT OF THE DISCLOSURE

A recording material comprises, on a support, a recording layer including a diazo compound, a coupler compound that can react with the diazo compound to form a color, and a metal salt, wherein the coupler compound is represented by the general formula (1):

General formula (1)



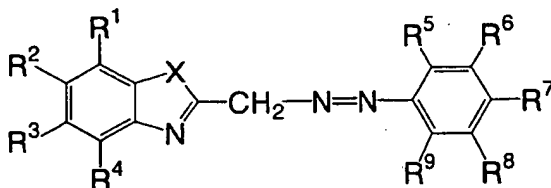
wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> each independently represent a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, or an amino group; R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> each independently represent a hydrogen atom, a halogen atom, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an alkylsulfonyl group, an arylsulfonyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, an acyloxy group, an acyl group, a carbamoyl group, an acylamino group, a sulfamoyl group, a sulfonamide group, a cyano group, or a nitro group; and X represents an oxygen atom or a sulfur atom.

WHAT IS CLAIMED IS:

1. A recording material comprising: on a support, a recording layer including a diazo compound, a coupler compound that can react with the diazo compound to form a color, and a metal salt, wherein

the coupler compound is represented by the general formula (1):

General formula (1)



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> each independently represent a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, or an amino group; R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> each independently represent a hydrogen atom, a halogen atom, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an alkylsulfonyl group, an arylsulfonyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, an acyloxy group, an acyl group, a carbamoyl group, an acylamino group, a sulfamoyl group, a sulfonamide group, a cyano group, or a

nitro group; any of R<sup>1</sup> to R<sup>9</sup> may have a substituent; and X represents an oxygen atom or a sulfur atom.

2. The recording material according to claim 1, wherein at least one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> in the general formula (1) is a hydrogen atom, an alkyl group or an alkoxy group.

3. The recording material according to claim 1, wherein at least one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> in the general formula (1) is a hydrogen atom or an alkoxy group.

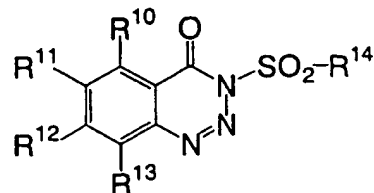
4. The recording material according to claim 1, wherein at least one of R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> in the general formula (1) is a hydrogen atom, a halogen atom, an alkyl group, an aryl group, an alkoxy group, an alkoxycarbonyl group, or an acyl group.

5. The recording material according to claim 1, wherein at least one of R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> in the general formula (1) is a hydrogen atom, a halogen atom, an alkyl group, an aryl group, or an alkoxy group.

6. The recording material according to claim 1, wherein the coupler compound has a solid content of 0.02 g/m<sup>2</sup> to 5 g/m<sup>2</sup>.

7. The recording material according to claim 1, wherein the diazo compound is a compound represented by the following the general formula (2):

General formula (2)



wherein R<sup>10</sup>, R<sup>11</sup>, R<sup>12</sup>, and R<sup>13</sup> each independently represent a hydrogen atom, a halogen atom, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an alkylsulfonyl group, an arylsulfonyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, an acyloxy group, an acyl group, a carbamoyl group, an acylamino group, a sulfamoyl group, a sulfonamide group, a cyano group, or a nitro group; and R<sup>14</sup> represents an alkyl group or an aryl group.

8. The recording material according to claim 7, wherein at least one of R<sup>10</sup>, R<sup>11</sup>, R<sup>12</sup>, and R<sup>13</sup> in the general formula (2) is a hydrogen atom, a halogen atom, an alkylsulfonyl group, an arylsulfonyl group, an acyl group, a cyano group, or a nitro group.

9. The recording material according to claim 1, wherein the diazo compound has a solid content of 0.02 g/m<sup>2</sup> to 5 g/m<sup>2</sup>.

10. The recording material according to claim 1, wherein the metal salt is a divalent metal salt.

11. The recording material according to claim 1,

wherein the metal salt is at least one selected from the group consisting of zinc sulfate, zinc chloride, zinc 2-ethylhexanoate, copper sulfate, manganese chloride, aluminum sulfate, nickel chloride, cobalt chloride, and iron nitrate.

12. The recording material according to claim 1, wherein the metal salt is at least one selected from the group consisting of zinc 2-ethylhexanoate, zinc sulfate and zinc chloride.

13. The recording material according to claim 1, wherein the metal salt has a solid content of 0.002 g/m<sup>2</sup> to 5 g/m<sup>2</sup>.

14. The recording material according to claim 1, wherein the recording layer is a thermal recording layer in which a color is formed by the application of heat.

15. The recording material according to claim 1, wherein the diazo compound is encapsulated in microcapsules.

16. The recording material according to claim 1, wherein both the diazo compound and the metal salt are encapsulated in microcapsules.

17. The recording material according to claim 16, wherein the microcapsules have a capsule wall comprising at least one of polyurethane and polyurea.

18. The recording material according to claim 1,



wherein the recording layer includes an organic base.

19. The recording material according to claim 1,  
wherein the recording layer includes a coloring aid.

20. The recording material according to claim 1,  
wherein a protective layer is disposed on the recording  
layer.

=> FIL REG

FILE 'REGISTRY' ENTERED AT 10:43:03 ON 29 JUL 2005

=> d his

FILE 'HCAPLUS' ENTERED AT 09:49:52 ON 29 JUL 2005

L1 1 S US20040082472/PN  
SEL RN

FILE 'REGISTRY' ENTERED AT 09:50:19 ON 29 JUL 2005

L2 5 S E1-E5

FILE 'LREGISTRY' ENTERED AT 09:58:18 ON 29 JUL 2005

L3 STR

FILE 'REGISTRY' ENTERED AT 10:01:39 ON 29 JUL 2005

L4 3 S L3  
L5 17 S L3 FUL  
L6 2 S L2 AND L5  
SAV L5 CHU779/A

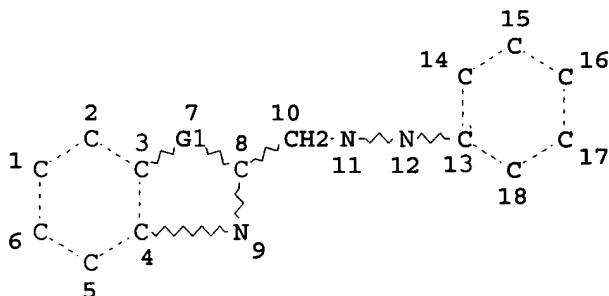
FILE 'HCAPLUS' ENTERED AT 10:21:35 ON 29 JUL 2005

L7 3 S L5

FILE 'REGISTRY' ENTERED AT 10:43:03 ON 29 JUL 2005

=> d que 17

L3 STR



VAR G1=S/O

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 18

STEREO ATTRIBUTES: NONE

L5 17 SEA FILE=REGISTRY SSS FUL L3

L7 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L5

=> fil hcap

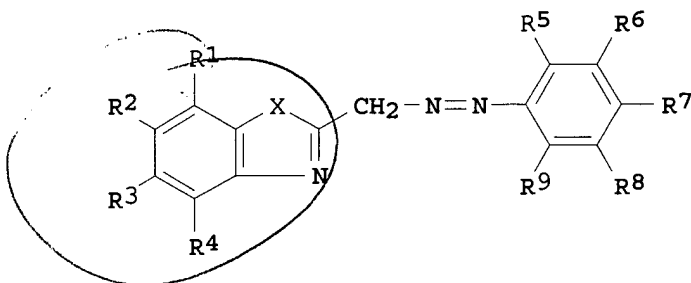
FILE 'HCAPLUS' ENTERED AT 10:43:22 ON 29 JUL 2005

=> d 17 1-3 ibib abs hitstr hitind

L7 ANSWER 1 OF 3 HCAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 2004:353129 HCAPLUS  
 DOCUMENT NUMBER: 140:383145  
 TITLE: Recording material  
 INVENTOR(S): Takeuchi, Yohsuki; Arai, Yoshimitsu;  
 Yanagihara, Naoto  
 PATENT ASSIGNEE(S): Fuji Photo Film Co., Ltd., Japan  
 SOURCE: U.S. Pat. Appl. Publ., 17 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004082472	A1	20040429	US 2003-690779	2003 1023
JP 2004142203	A2	20040520	JP 2002-308444	2002 1023
PRIORITY APPLN. INFO.:			JP 2002-308444	A 2002 1023

OTHER SOURCE(S): MARPAT 140:383145  
 GI



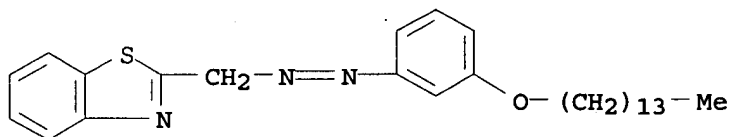
I

AB A recording material comprises, on a support, a recording layer including a diazo compound, a coupler compound that can react with the diazo compound to form a color, and a metal salt, wherein the coupler compound is represented by the general formula I (R1-4 = H, alkyl group, aryl group, alkoxy group, amino group; R5-9 = H, halogen atom, alkyl group, aryl group, alkoxy group, aryloxy group, alkylthio group, arylthio group, alkylsulfonyl group, arylsulfonyl group, alkoxy carbonyl group, aryloxy carbonyl group, acyloxy group, acyl group, carbamoyl group, acylamino group, sulfamoyl group, sulfonamide group, cyano group, nitro group; and X = oxygen atom or a sulfur atom).

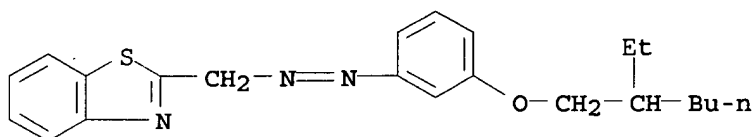
IT 683262-65-9 683262-66-0

(coupler; thermal recording material containing)

RN 683262-65-9 HCAPLUS

CN Benzothiazole, 2-[[[3-(tetradecyloxy)phenyl]azo]methyl]- (9CI)  
(CA INDEX NAME)

RN 683262-66-0 HCAPLUS

CN Benzothiazole, 2-[[[3-[(2-ethylhexyl)oxy]phenyl]azo]methyl]- (9CI)  
(CA INDEX NAME)

IC ICM B41M005-20

INCL 503227000

CC 74-7 (Radiation Chemistry, Photochemistry, and Photographic and  
Other Reprographic Processes)

IT 683262-65-9 683262-66-0

(coupler; thermal recording material containing)

L7 ANSWER 2 OF 3 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 1955:69057 HCAPLUS

DOCUMENT NUMBER: 49:69057

ORIGINAL REFERENCE NO.: 49:13223b-d

TITLE: Coupling of diazonium compounds with  
2-methylbenzothiazoles

AUTHOR(S): Pierrot, Francois; Wahl, Henri

SOURCE: Compt. rend. (1954), 239, 1049-51

DOCUMENT TYPE: Journal

LANGUAGE: Unavailable

GI For diagram(s), see printed CA Issue.

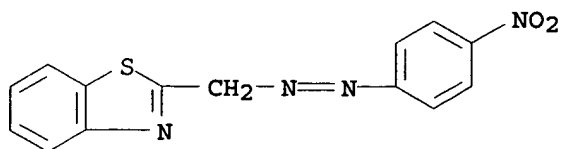
AB o-C6H4.S.CMe:NMe+X-couples with diazonium salts to give  
o-C6H4.NMe.C[:C(N2R)2].S. o-O2NC6H4NH2 diazotized  
and treated with an equimolar amount of 2-methylbenzothiazole in  
AcOH at pH between 0.75 and 2 gives an orange-red precipitate which is a  
mixture, one component being o-C6H4.N:C(CH2N:NC6H4NO2-  
o).S (I), separated by dissolving in hot acetone, pale yellow  
needles, m. 271.5° (from alc.). That coupling occurred at  
the 2-position was established by the identical spectra of  
2-formylbenzothiazole o-nitrophenyl hydrazone (II), m.  
271.5° (C.A. 31, 3050.2) and I. Both I or II with MeI give  
o-C6H4.NMe.C(:CHN:NC6H4NO2-o).S identical with the  
product from treating 2,3-dimethylbenzothiazolium Me sulfate with  
p-O2NC6H4NHNO.

IT 855464-87-8, Benzothiazole, 2-[(p-nitrophenylazo)methyl]-  
(preparation of)

RN 855464-87-8 HCAPLUS

CN Benzothiazole, 2-[(p-nitrophenylazo)methyl]- (5CI) (CA INDEX

NAME)



CC 10 (Organic Chemistry)

IT 855464-87-8, Benzothiazole, 2-[(p-nitrophenylazo)methyl]-  
(preparation of)

L7 ANSWER 3 OF 3 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 1953:20701 HCAPLUS

DOCUMENT NUMBER: 47:20701

ORIGINAL REFERENCE NO.: 47:3567i,3568h-i,3569a

TITLE: Bisazo dyes derived from 2,3-dimethylbenzothiazolium salts

AUTHOR(S): Wahl, Henri; Lebris, Marie Therese

SOURCE: Compt. rend. (1952), 235, 1405-6

DOCUMENT TYPE: Journal

LANGUAGE: Unavailable

AB A crystalline compound, m. 248°,  $\lambda_{\text{maximum}}$  450 m $\mu$ , corresponding to a tautomer of 3-methyl-2-(phenylazomethyl)benzothiazolium methosulfate and 3-methyl-2-(phenylhydrazonomethyl)benzothiazolium methosulfate (I-methosulfate), was obtained by heating an alc. solution of a 2,3-dimethylbenzothiazolium salt (II) with diazoaminobenzene. I-Chloride, m. 219°,  $\lambda_{\text{maximum}}$  450 m $\mu$ , was produced directly from I or by transforming II to the azomethine (III) (methosulfate, m. 194-5°) with p-nitrosodimethylaniline and treating III in HCl with PhNHNH<sub>2</sub>. I-Nitrate, m. 263°, was also prepared I coupled in pyridine with PhN<sub>2</sub>Cl to form 3-methyl-2-[bis(phenylazo)methylene]benzothiazoline, m. 183° (from alc.), identical with that obtained by direct diazo coupling of II. III and p-O<sub>2</sub>NC<sub>6</sub>H<sub>4</sub>NHNH<sub>2</sub> gave the p-nitro analog of I-nitrate, m. 241-2°, which coupled with p-O<sub>2</sub>NC<sub>6</sub>H<sub>4</sub>N<sub>2</sub>Cl to produce 3-methyl-2-[bis(p-nitrophenylazo)methylene]benzothiazoline, m. 287° (from pyridine),  $\lambda_{\text{maximum}}$  490 m $\mu$ .

IT 855467-05-9, Benzothiazolium, 3-methyl-2-[(p-nitrophenylazo)methyl]-, nitrate  
(preparation of)

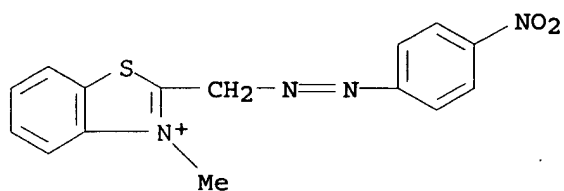
RN 855467-05-9 HCAPLUS

CN Benzothiazolium, 3-methyl-2-[(p-nitrophenylazo)methyl]-, nitrate  
(5CI) (CA INDEX NAME)

CM 1

CRN 855467-04-8

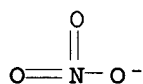
CMF C15 H13 N4 O2 S



CM 2

CRN 14797-55-8

CMF N 03



CC 25 (Dyes and Textiles Chemistry)

IT 29770-20-5, Benzothiazoline, 2-[bis(phenylazo)methylene]-3-methyl-  
854091-12-6, Benzothiazolium, 3-methyl-2-[(p-  
nitrophenyl)hydrazonomethyl]-, nitrate **855467-05-9**,  
Benzothiazolium, 3-methyl-2-[(p-nitrophenylazo)methyl]-, nitrate  
(preparation of)